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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,699	09/14/2005	Thomas N. Horsky	211843-00032	6928
27160 7590 02/04/2010 KATTEN MUCHIN ROSENMAN LLP (C/O PATENT ADMINISTRATOR) 2900 K STREET NW, SUITE 200 WASHINGTON, DC 20007-5118			EXAMINER SMITH, JOHNNIE L	
			ART UNIT 2881	PAPER NUMBER
			MAIL DATE 02/04/2010	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/519,699

**Applicant(s)**

HORSKY ET AL.

**Examiner**

JOHNNIE L. SMITH

**Art Unit**

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/CD)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 10/21/2009 have been fully considered but they are not persuasive.
2. Applicant argues that the prior art references taken in alone and taken in combination fails to teach the step of "producing a volume of gas phase molecules of a boron hydride  $B_nH_m$ , where  $n$  and  $m$  are integers and  $n > 10$  and  $m > 0$ ". The examiner agrees with applicant, in that Goto fails to teach such a limitation, but the examiner disagrees that such a limitation would be considered an inventive step. Boron clusters and Octadecaborane are both considered notoriously old and common materials in the art. Merely producing a known material in an old method (ion implantation) would not render the said claims allowable over the prior art reference. Relevant prior art references such as 2005/0274903 (Goldberg) and 2005/0169828 (Spielvogel et al) disclose the use of Boron clusters and implanting. Applicant is merely reproducing a known material in a known method. Goto teaches that implantation of a single  $B_{10}H_{14}$  ion is equivalent to implantation of 10 B atoms. Therefore, the effective dose will also become 10 times as large as the implantation of a single B atom. One would be

compelled to use Octadecaborane for the purpose of yielding an 18 times enhancement in dose rate.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1, 2-4, 6, 10, 13-14, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6013332 (Goto et al) in view of US 20050274903 (Goldberg et al).
6. In reference to claims 1, 2-4, 10 and 13-14, Goto teach a method of implanting ions (claim 1) having steps of: producing a volume of gas phase molecules of a boron (column 2 lines 28-29); ionizing the boron molecules

(column 2 lines 29-30); and accelerating the ionized boron hydride molecules by an electric field into a target (column 2 lines 31-32). Goto teach having a Boron molecule =10 which would be within applicants range of  $B > 10$ . Goldberg teaches implanting wherein the feed vapour is Decaborane, with a view to producing monatomic boron ions for implantation (figure 1). Goldberg further teach that other boranes may be used instead, for example diborane, pentaborane, and octadecaborane (paragraph 0034).

7. It would have been obvious to modify the teachings of Goto since Goto teaches that implantation of a single  $B_{10}H_{14}$  ion is equivalent to implantation of 10 B atoms. Therefore, the effective dose will also become 10 times as large as the implantation of a single B atom. One would be compelled to use Octadecaborane for the purpose of yielding an 18 times enhancement in dose rate.

8. In reference to claims 6 and 16, Goto teach a method having a step of accelerating boron hydride ions into a silicon target (column 2 lines 20-22).

9. Claims 5, 7-9, 15, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6013332 (Goto et al) in view of 2005/0006799 (Gregg et al). In reference to claims 5 and 15, Goto fails to teach applicant disclosure of producing a volume of gas by sublimation of a solid by heating above  $20^{\circ}\text{C}$ . Gregg teach a vaporizer (110) used to vaporize any suitable material in a solid state

characterized by a sublimation temperature in the range of, for example, approximately 20 degrees Celsius to approximately 300 degrees Celsius (paragraph 0029). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Gregg into the disclosure of Goto since it is well known in the art to have a vaporizer to vaporize any suitable material in any suitable one or more states and/or in any suitable one or more forms as taught in the disclosure of Gregg (paragraph 0028). One would be compelled to do so for the purpose of delivering a desired gas to process equipment.

**10.** In reference to claim, 7-9 and 17-19, Goto teach accelerating boron hydride into a silicon semiconductor substrate (column 2 lines 20-22). But failed to disclose applicant's disclosure of having silicon-on-insulator substrate target, and strained superlattice substrate target. It would have been obvious to one of ordinary skill in the art at the time of the invention to have such an element as a matter of design choice since Goto teach the use of silicon semiconductor substrates.

**11.** Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6013332 (Goto et al) in view of US 2004/0022202 (Horsky et al). In reference to claims 10 and 11, Goto teach the use of an electric field (14) but failed to teach wherein the said electric field is a time-varying or pulsed electric field. Goto is also silent on if the said field is a constant or DC electric field. Such

limitations can be found in the teachings of Horsky (paragraph 0060 line 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Horsky into the disclosure of Goto since the use of an electric field is taught and discussed above, the limitations being claimed are merely variations of such teachings and would not have involved an inventive step.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. All of the references cited on attached PTO 892 contain art similar to that being claimed by applicant.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHNNIE L. SMITH whose telephone number is (571)272-2481. The examiner can normally be reached on Monday-Thursday 6-4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571.272.2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David A Vanore/  
Primary Examiner, Art Unit  
2881

/J. L. S./  
Examiner, Art Unit 2881